



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

Contributions to the PALÆONTOLOGY of Illinois and other Western States.

BY F. B. MEEK & A. H. WORTHEN,

(Of the Illinois State Geological Survey.)

RADIATA.

ECHINODERMATA.

CRINOIDEA.

BELEMNOCRINUS WHITII, M. & W.

Body below the summit of the subradials ovoid subcylindrical, and above this rather rapidly expanding; rounded below. Basal pieces very small, forming a flat subpentagonal disc, as seen from below; ancylosed so as to obliterate the sutures in the specimen examined. Subradial pieces unequal, three of them narrow, oblong or two and a-half to three times as long as wide, one scarcely more than twice as long as wide, and the other narrow below, but nearly two-thirds as wide above as the entire length. First radials (or at least the only one remaining in the typical specimen) quadrangular, nearly half as long as the subradials, and wider at the top than the smallest subradial, narrow below, and widening upwards; rather deeply sinuous above across its entire breadth, for the reception of the second radial. Cavity of the subcylindrical part of the body formed by the subradials, infundibuliform, the wide part above extending down about one-fourth of the way. Anal piece resting upon the slightly concave upper extremity of the largest subradial piece between two of the first radials; its form unknown. Surface nearly smooth or merely granulose. A slightly impressed, distinctly defined, obovate flattened area, occupies the whole surface of the anal plate, a small portion of the upper margin of the subradial upon which it rests, and a larger part of the first radial on one or both sides of the anal piece. Column and arms unknown.

Length of body to the summit of first radial pieces, 0.57 inch; breadth of same at the top, about 0.35 inch; do. of same at the summit of subradials, 0.25 inch.

This species differs from *B. typus*, of White, the only other known species of the genus, in its proportionally shorter and more oval form below the summit of the first radial pieces, and the greater expansion above; also in the greater inequality in the size and form of the subradial pieces; and in the peculiar flattened or impressed area in the region of the anal piece. It likewise differs in having the depression in the upper side of the only remaining first radial, for the reception of the second radial, proportionally broader; while the visceral cavity occupies near one-fourth the length of that portion of the body formed by the subradials, instead of only about one-tenth.

The specific name is given in honor of Prof. C. A. White, the accomplished State Geologist of Iowa.

Locality and position.—Lower bed of Burlington limestone, of the Subcarboniferous series at Burlington, Iowa. Mr. Charles Wachsmuth's collection.

Subgenus NEMATOCRINUS. M. & W.

SYNBATHOCRINUS WACHSMUTHI, M. & W.

General form, when the arms are folded together, elongate cylindrical; body below the arms small and basin-shaped, being truncate below for the reception of apparently a rather large column, thence spreading rapidly to the summit of the first radials, which are horizontally truncated on the same plane all around their entire breadth above. Arms simple, very slender, equal and elongated,—rising abruptly from the first radials, seven to each, or thirty-five in the entire series, and composed each of a single series of pieces, twice to three times as long as wide, and very like the joints of the tentacula of other crinoids. (Form and arrangement of the plates of the body unknown.)

1866.]

Height of body, 0.12 inch; breadth about 0.30 inch; breadth of truncation of the base, 0.14 inch; length of arms, known to be at least 1.35 inch, but probable more; uniform breadth of do., 0.03.

We very strongly suspect that this little crinoid will be found to be the type of a new genus bearing somewhat similar relations to *Synbathocrinus* that *Pterotocrinus* bears to *Dichocrinus*. The fact, however, that we have been unable, after repeated trials, to make out the form and arrangement of the plates composing the body, has caused us to place it provisionally, for the present, as a subgenus under *Synbathocrinus*, with which it agrees exactly in form and general habit, as well as in having the base composed of three anchlyosed pieces. Even if it should, however, be found to possess precisely the structure of *Synbathocrinus* so far as regards the body below the arm-bases, we think its very peculiar character of having seven arms (instead of only a single one) rising directly from the summit of each broadly truncated, first radial piece, a sufficient difference to entitle it to rank as the type of a distinct subgenus, if not indeed of a distinct genus. The fact that all the species of *Synbathocrinus* have, so far as known, but a single arm rising from each ray, renders it improbable that there will be found intermediate gradations in this character when a greater number of species are known.

On one side of the specimen there is some appearance of a small cuneiform anal piece resting upon the first radials, between two of the arm bases, as in *Synbathocrinus*, though we are rather inclined to think this merely the base of one of the arms folded in between the others so as to be hidden, excepting at its base, by the closing together of the arms on each side. We have counted this as an arm, and, consequently, if it should prove to be an anal piece, there would be but thirty-four arms, which would leave but six instead of seven arms in one of the rays—perhaps the anterior one.

We have named this curious species after Mr. Charles Wachsmuth, of Burlington, Iowa, its discoverer, and one of the most successful collectors at that interesting locality.

Locality and position.—Burlington, Iowa, from the upper part of the Burlington group, of the Subcarboniferous series.

CYATHOCRINUS FARLEYI, M. & W.

Body, below the summit of the first radial pieces, rather deep cup shaped or subglobose (oblique in the typical specimen), and composed of thick strong pieces; under side rounded. Base subdiscoidal or depressed basin-shaped, with a pentagonal outline, composed of unequal pentagonal pieces, very narrow at their connection with the column, and widening rapidly to their lateral angles; all curved upwards at their superior outer extremities. Subradial plates three or four times as large as the basal pieces, about as wide as long, convex, and each provided with several irregular wart-like protuberances in the middle; four of them hexagonal, and one on the anal side heptagonal. First radial pieces a little larger than the subradials, wider than high, and each having a general pentagonal outline, but the superior lateral angles, which usually curve inwards somewhat between the second radials, are more or less truncated; facet for the reception of the second radials large, or occupying about three-fourths the breadth of the upper side of each piece, and on the outer side excavated downwards near half the length of the plate, with a distinct outward slope. First anal piece about the size of the largest basal pieces, quadrangular in general outline, but having two other inconspicuous angles above, in consequence of small facets for the reception of three small pieces in the next range, probably belonging to the vault; resting squarely upon the upper truncated side of the heptagonal subradial piece, and connecting on each side with the adjacent first radials, above the horizon of the summits of which it does not project. Surface smooth or finely granular, with the exception of the irregular pustulose protuberances on the middle of each subradial plate. (Arms and column unknown.)

Height to summit of first radial pieces, 0.68 inch; breadth, 0.80 inch.

[July,

This species will be readily distinguished from all others known to us, by the peculiar little wart-like protuberances on the middle of each subradial piece. These are not incipient radial costæ, nor properly nodes, but little irregular pustular prominences like drops of melted wax. Some of them are confluent, while others are distinct and irregularly grouped. They rarely extend to the margins of the plates, and are almost entirely confined to the subradials, though there are some faint indications of one or two on the lower half of one of the first radials.

This species is named in honor of Dr. R. D. Farley, of Jerseyville, Illinois, to whom the Illinois Geological Survey is indebted for some interesting specimens.

Locality and position.—Keokuk division of the Subcarboniferous series, near Warsaw, Ill.

ACTINOCRINUS CALYCVLUS var. HARDINENSIS.

Although this little crinoid agrees so nearly with *Actinocrinus calyculus*, Hall, that we are in doubt in regard to the propriety of considering it a distinct species, the fact that it comes from the upper part of the St. Louis limestone, while the *A. calyculus* holds a position in the Spergen Hill beds, 200 feet below, taken in connection with the usually restricted range of the *Crinoidea*, and some slight differences of structure mentioned below, cause us to place it for the present, at least, as a distinct variety from the typical *A. calyculus*.

In size, form, arm formula, surface markings, and most of its characters, it agrees well with *A. calyculus*, from which it differs in the following details, viz.: Instead of having but one or two interrarial pieces to each space, the first one much larger than the others, and ten or eleven sided, it has four or five of these pieces to each interrarial area, the first of which is not greatly larger than the others and only six to eight sided. Again it differs in having six anal pieces instead of but four, while its vault pieces are merely tumid instead of "acutely spiniferous," excepting a few of those in the depressions between the arm bases, which support little short spines.

If *Butocrinus* should be separated from the genus *Actinocrinus*, this species should doubtless be placed in it, as it has the general habit of the species of that group, though its arm bases do not form a quite continuous series, the intermediate spaces between those belonging to each two adjacent rays being more deeply sinuous than those between each two of those belonging to the same ray.

Locality and position.—Hardin County, Illinois, from the upper part of the St. Louis division of the Subcarboniferous series,—the highest position in which the genus has yet been recognized in this country.

Genus STROTOCRINUS, M. & W.

Calathocrinus, Hall, (subgen. *Actinocr.*), 1861. Descript. Crinoidea, Prelim. Notice, p. 12; (not Von Meyer, 1848,—Leonhard and Bronn's Jahrb. p. 467.)

The name *Calathocrinus* was proposed by Prof. Hall in the paper above cited, for a group including those curious species of so-called *Actinocrinus*, with an obconic body and the summit more or less flattened and greatly spread out in the form of a ten-rayed star, such as *Actinocrinus perumbrosus*, *A. regalis*, Hall, &c. As the name *Calathocrinus* had, however, been previously used for another type by von Meyer, in 1848, it becomes necessary to find another name for our American group, and we have consequently proposed to call it *Strotocrinus*, in the Report of the Illinois Geological Survey (p. 188), now in press. It includes *Strotocrinus perumbrosus*, *S. regalis*, *S. glyptus*, *S. erodus* and *S. lyratus*, all of which had been described by Prof. Hall under *Actinocrinus*.

Genus STEGANOCRINUS, M. & W.

We have proposed the above name in the Illinois Report (p. 195) now in press, for a genus allied to *Actinocrinus*, with which it agrees in the structure of the body, but differs in having the rays from the second or third primary radial pieces 1866.]

greatly extended out horizontally in the form of remarkably elongated, slender, rigid, arm-like appendages, which are covered in above, all the way out, with small pieces like these of the vault, and bear the true arms along their sides. In some species, these long free rays are known to bifurcate once, while in others they are simple all the way out, so that in the latter the radial pieces may be said to continue indefinitely in a direct line.

Type.—*Steganocrinus pentagonus*, = (*Actinocrinus pentagonus*, Hall.) It also includes *Steganocrinus araneolus*, = (*Actinocrinus araneolus*, M. & W.), and *S. sculptus* = *Actinocrinus sculptus*, Hall.

RHODOCRINUS NANUS, M. & W.

Body small, subglobose, with nearly vertical sides which round under below to the basal concavity. Base very small, and entirely concealed in the concavity of the under side, by the end of the column. Subradial pieces comparatively large, forming the under side of the body, and curved up so as to show nearly half the surface of each in a side view,—hexagonal in general outline, but probably each with a seventh nearly obsolete angle at the middle of the side connecting with the base. First radials nearly as large as the subradials, and regularly heptagonal in form; second radials rather more than half as large as the first, normally hexagonal, but sometimes pentagonal and rarely quadrangular; third radials larger than the second, generally wider than long, pentagonal, hexagonal or heptagonal, and supporting upon their superior sloping sides, apparently the first brachial pieces, which are not free, but supported by the first free pieces in the next range; if there were no farther divisions of the free rays, there must therefore have been two arms to each ray, or ten in the entire series. First interradials smaller than the first radials, and resting upon the truncated upper sides of the subradials, regularly hexagonal in form, or rarely with the superior angle slightly truncated by the middle piece of the next range, so as to form a seventh angle; second range consisting of two, or rarely three, rather smaller generally hexagonal pieces, above which there are five or six other still smaller pieces connecting with the vault between the arm bases, thus making some eight or nine interradials to each area; anal pieces about the same number as in each interradial space, but a little larger in size and differently arranged, there being three pieces in each of the ranges above the first one, the middle ones of which continue on up in a right line to connect with the base of the proboscis above. Vault depressed to the level of the upper side of the arm-bases, and provided with deep broad furrows or depressions radiating from near the middle to the interradial spaces, composed of small, irregular, rather tumid pieces. Opening in the summit of a short, rather narrow lateral proboscis, which rises vertically, with its outer side nearly on a line with the vertical side of the anal area.

All the body plates are convex in the middle, from which point rather obscure ridges radiate to each of their sides. The greater convexity and larger size of the radial pieces impart a somewhat pentagonal outline to the body, as seen from above or below. The surface is somewhat granular, and the column, which is composed near the base of alternately thicker and thinner pieces, is round and pierced by a minute rounded cavity.

Height of body, 0.33 inch; breadth of do., 0.35 inch.

This neat little species is evidently closely allied to *R. Barrisi*, of Hall, from which it differs in having its body plates merely convex and provided with radiating ridges, instead of being "ornamented by sharp, angular nodes and spines;" also in having eight or nine interradial pieces to each area, instead of only four to six. Another difference is to be observed in the size of the third radial pieces, which in *R. Barrisi* are "minute," while in our species they are as large as the second radials. We only know the *R. Barrisi* from the published description, but we have been assured by M. Wachsmuth, who compared the form under consideration with authentic examples of that species, that they are easily distinguished.

[July,

Locality and position.—Burlington, Iowa. Lower beds Burlington group of the Subcarboniferous series. Mr. Wachsmuth's collection.

Genus *ONYCHOCRINUS*, Lyon and Casseday, 1859.

Although for some time past inclined, like others, to regard the type for which the name *Onychocrinus* was proposed, as probably in no respect distinguishable from *Forbesiocrinus*, recent comparisons of some fine examples of these forms lead us to think that they may be even generically distinct. At any rate, they are certainly distinguishable upon more constant characters than those separating *Forbesiocrinus* from *Taxocrinus*, which groups we have elsewhere shown* blend together to such an extent that we do not think they can be separated more than subgenerically, upon any characters yet pointed out.

At present we are inclined to regard *Onychocrinus* as being generically distinct from *Forbesiocrinus* and *Taxocrinus*, but it may possibly form a second subgenus under *Taxocrinus*. In the nature of the column, the number and arrangement of the basal, subradial and primary radial pieces, *Onychocrinus* agrees exactly with *Forbesiocrinus*: while in other points of structure these types differ to an extent that could scarcely fail to attract the attention of the most careless observer, on comparing good specimens of each. In the first place, *Onychocrinus* differs from *Forbesiocrinus* in having the rays from their origin more divergent, or even in some instances extending out horizontally on the same plane with the base; while in these extreme cases the long rays, which are free in to the second radial pieces, and bear the small arms in clusters at their extremities, have their under sides rounded, and their lateral margins curved up on each side to meet apparently a series of pieces covering them over above. According to Lyon and Casseday these forms also have the vault covered over with solid calcareous pieces—a character not known to occur in *Forbesiocrinus*. Another difference is always observable in the anal side of these types, which in *Onychocrinus*, instead of being occupied by as many pieces as the interrarial spaces, or a larger number, as in *Forbesiocrinus*, is often so deeply excavated as to destroy the symmetry of the body, and only occupied by a single row of very small pieces, mounted one upon another, and resting in a sinus in the upper side of the largest subradial, so as to look much like a little dwarfed simple arm. On each side of this little arm-like range of anal pieces, there is a free open space between it and the adjacent rays, whatever may be the number of pieces filling the interrarial spaces between the other rays. How this range of little anal pieces (of which there never seems to be more than six or eight) connects with the vault, we have been unable to determine, as they are always, so far as we have had an opportunity to see, entirely disconnected from all parts of the body, excepting the single subradial upon which they rest. We suspect, however, that they may have formed the outside of a small lateral proboscis, the inner side of which was merely covered by a soft dermal integument.

This peculiar character of the anal side, in *Onychocrinus*, seems to have been entirely overlooked or misunderstood in the species of this group referred to *Forbesiocrinus*—the impression being that the anal plates had been, by some accident, removed from their place. It is true, we had observed that the anal area in our *F. monroensis* and *F. Norwoodi* is only occupied by a slender little finger-like appendage, resting upon the upper side of the large odd subradial, but, as stated in our remarks in relation to the former species, we supposed the anal plates had been removed, and that the little rounded finger-like appendage occupying their place, was only one of the smaller subdivisions of one of the arms that had been accidentally placed in that position. We have seen this character, however, in the following species, which we have in the Illinois Report referred to *Onychocrinus*, viz., *Forbesiocrinus asteriaformis*, *F. Whitfieldi* and *F. Meeki*, Hall; also in our *F. monroensis* and *F. Norwoodi*, as well as in the new species described in this paper. In the typi-

* Proceed. Acad. Nat. Sci. Philad., Aug., 1865, p. 138.

cal specimen of *F. Meeki* now before us, the anal space, as may be seen by the figure in the Iowa Report, is entirely vacant, and also without the little row of anal pieces. In five other good examples of this species before us, however, this character is more or less clearly seen.

From the typical forms of *Taxocrinus*, *Onychocrinus* differs in nearly all the characters distinguishing it from *Forbesiocrinus*, as well as in having usually as many interradial pieces as the latter.

As thus separated from *Forbesiocrinus* and *Taxocrinus*, *Onychocrinus* still seems to include two types that may yet be found separable, since *Forbesiocrinus asteriaformis*, Hall, and our species *diversus* described in this paper, differ from the other species mentioned in having the rays more spreading and free in as far as to the second radial pieces, with arms clustered in little bunches at the extremities of the rays far out from the body; and the free rays apparently covered above, at least a part of the way out. It is in this type, if we have correctly understood Messrs. Lyon and Casseday, that they found the vault composed of solid calcareous pieces, while in the other species we have mentioned the vault is unknown.

Such species as our *O. diversus*, described in this paper, with their long, spreading, bifurcating rays, and numerous little curled-up arms at their extremities, must, when perfect, have presented much the appearance of dried specimens of the existing genus *Astrophyton*; but we cannot agree with the authors of the genus or subgenus *Onychocrinus* in the opinion that this type forms a connecting link between the *Crinoidæ* and the *Asteroidæ*, or that it is more nearly allied to the Star-fishes than other crinoids.

ONYCHOCRINUS DIVERSUS, M. & W.

Body and rays forming together an irregular five-rayed star, the body being comparatively small, depressed, and distorted by the deeper excavation of the anal side; while the rays are large, stout, rigid and free, from the second radial pieces outward, and extend out horizontally on the same plane with the base. Basal pieces hidden by the column, or merely showing as a thin ring scarcely distinguishable from the last segment of the column, when the latter is attached. Subradial pieces comparatively large; four of them equal, wider than long, and all pentagonal, with the upper sloping sides longer than the lateral margins; the fifth one larger (particularly longer) than the others and apparently hexagonal. Radial pieces five to each ray, thick and strong, and after becoming free on the second pieces, curving strongly up on each side of the ray, so as to make the underside of the free rays distinctly rounded; first radial pieces considerably larger than the subradials, of rather unequal size, wider than long, and heptagonal in form, with probably the exception of one or two of those on the anal side, which appear to be truncated on one side, so as to be hexagonal in outline. Succeeding radials diminishing gradually in size, the second and third being wider than long, hexagonal and pentagonal in form, and the fourth transversely oblong, as seen from below; while the fifth is pentagonal, as seen from beneath, having an obtuse middle angle on the outer side. Beyond this the rays are each composed of a double series of strong pieces, which are slightly disposed to assume an alternating arrangement, the two series continuing in close contact laterally to the fourth pieces beyond the commencement of the double series on the fifth radials, and then diverging abruptly at an angle of 90° to 100° , to form distinct rounded branches. At the outer bases of these branches an arm is given off on each side on the third piece from the commencement of the double series, and bifurcates so as to form a bunch of small armlets; beyond this the two main divisions of the rays continue on, each composed of a single range of pieces, until the third piece beyond the lateral arms just mentioned, after which they are each composed again of a double series of pieces, on the third of which another arm is thrown off on each side, and bifurcates as before. After

[July,

this each main branch bifurcates without much divergence of the subdivisions, which are short and divided, so as to form together a bunch of small bifurcating arms, thus making altogether apparently not less than several hundred small armlets, or ultimate division of the rays, to the entire series.

The small armlets are all short, and form clusters at the extremities of the divisions of the horizontally extended strong rays, where they curve upwards, and fold together in bunches like the fingers of a clenched fist. They are each composed of a single series of small pieces, which are wider than long, with a minute patelliform piece at the underside of each, as in *Forbesiocrinus*.

Interradials three or four to each space, with others above belonging apparently more properly to the vault; first interrarial series hexagonal and resting in a notch between the upper sloping lateral margins of the subradials. Anal series consisting of a single free row of very small pieces resting upon the upper side of the largest subradial, so as to present much the appearance of an abortive armlet. Surface merely finely granular, with the exception of a small linear ridge along the middle of each armlet. (Vault unknown.)

Height of body, exclusive of vault, 0.80 inch; antero-posterior diameter, 0.90 inch; transverse diameter, 1.40 inch; greatest transverse diameter between the extremities of opposite rays, 4 inches; length of each of the two main divisions of each ray, 0.85 inch. Column at its connection with base, 0.28 inch in diameter, and composed of pieces only 0.01 inch in thickness, or ten to the tenth of an inch.

This species is related to *Onychocrinus asteriformis* = (*Forbesiocrinus asteriiformis*, Hall,) but differs in attaining a much larger size, as well as in having the two main divisions of each ray widely divergent and proportionally longer, instead of nearly parallel. Again it differs in having the subdivisions and armlets much more numerous; also in having always five primary radial pieces to each ray.

If reliable characters should hereafter be found for separating generically *Taxocrinus* from *Forbesiocrinus*, it is possible the name of this species would become *Forbesiocrinus (Onychocrinus) diversus*, unless equally good characters may be discovered for separating the three groups generically. It is quite as probable, however, that *Forbesiocrinus* and *Onychocrinus* may be both included as subgenera under *Taxocrinus*, in which case the name of our species would become *Taxocrinus (Onychocrinus) diversus*.

Locality and Position.—Burlington group, upper bed; Burlington, Iowa.

GRANATOCRINUS SHUMARDI, M. & W.

Body elliptic-oval, the length and breadth being as about 67 to 44. Base having the form of a nearly flat pentagonal disc, with moderately prominent angles; columnar facet round, and a little more than half as wide as the base. Radial pieces lanceolate oblong, or nearly three times as long as wide, most projecting and slightly narrower at the lower extremity, nearly flat between the pseudo-ambulacral areas, along the margins of which they project abruptly in the form of a prominent knife-like keel; forming five-sixths the entire length of the body, and each obliquely truncated on each side above, for the reception of the interradials. Pseudo-ambulacral fields very narrow, extending the entire length of the body, with almost exactly parallel sides; rather convex, and each with a moderately distinct, longitudinal mesial linear furrow, on each side of which about 65 pore pieces may be counted; lanceolate and supplementary pore pieces unknown. Interradial pieces about one-fourth the entire length of the body, rhombic in outline, or widest in the middle, and tapering nearly equally to the upper and lower extremities; all rather distinctly sloping inwards from the lateral angles to the middle, so as to present a notched appearance on the outer surfaces. (Openings of the summit unknown.) Surface showing, by the aid of a good magnifier, in a cross light, microscopic longitudinal lines near the lower end of the radial

pieces, and on the interradials much stronger lines parallel to their inferior sloping sides.

Length, 0.67 inch; breadth, 0.44 inch.

At a first glance, this species might be mistaken for the common *Pentremites melo*, of Owen and Shumard, from which it may be readily distinguished by several well marked characters. In the first place it is narrower in proportion to length, and differs in having its pseudo-ambulacral areas prominent instead of sunken, and bounded on either side by a sharply elevated thin carina; while its interambulacral areas are flat, or even a little concave, towards the lower part of the body, instead of being convex. It likewise differs in having scarcely a visible line, instead of a deep furrow along the sutures between the radial pieces; while its base is much larger, and not sunken, but on a level with the lower ends of the radial pieces, which are likewise more protuberant at the lower ends of the pseudo-ambulacral fields.

In its larger and more prominent base, our species agrees more nearly with a form described by us as a variety of *P. melo*, under the name *P. melo*, var. *projectus*, from which, however, it differs in all the other peculiarities mentioned. We now regard that form as a distinct species from *P. melo*.

Compared with *P. elongatus*, of Shumard, which it resembles in general form, it will be at once distinguished by its greatly narrower and more prominent pseudo-ambulacral areas, larger radial pieces, and proportionally larger interradials, which extend up to near the centre of the summit. These two forms may be regarded as the connecting links between the true *Pentremites* (*P. Godoni* group) and the *P. melo*, or *Granatocrinus* group. *P. elongatus*, however, falls clearly into the former, while the form under consideration belongs to the *melo* group.

Named in honor of Dr. B. F. Shumard, of St. Louis, Missouri, who has given more attention to the *Blastoidea* than any other person in this country.

Locality and position.—Burlington, Iowa, lower part of Burlington group of Subcarboniferous series. Mr. Wachsmuth's collection.

GRANATOCRINUS NORWOODI, O. & S. ?

Amongst some interesting Crinoids, loaned us for investigation by Mr. Wachsmuth, from the Burlington group at Burlington, Iowa, there is a beautiful specimen, resembling *G. Norwoodi* more than any other species known to us, with all the numerous little jointed, thread like arms, and a portion of the column attached. So far as we know, this is the only specimen of this group ever found with the arms attached. As might have been inferred from analogy, the arms in this type are apparently, in all respects, exactly as in the true *Pentremites*. About thirty of them can be counted arising from each pseudo-ambulacral area, though this is probably not the entire number, as they are folded together so that many of them may be hidden. They are very slender, simple, of uniform size, without any perceptible taper, and composed each of a single row of pieces as long as wide, of which about seven may be counted in the space of 0.10 inch. We are not sure they are entire, though it is evident that those attached near the lower part of the areas must be at least twice as long as the body. The column near the base is round and composed of thin pieces of equal size, but farther down there are wider ones, with smaller between at regular intervals.

The body of this specimen is partly hidden by the arms, but as far as can be determined it is as stated above, much like *G. Norwoodi*, with the following differences: In the first place, the parts of its radial pieces forming the interambulacral spaces are not more than half as wide as in specimens of *G. Norwoodi* of the same size. These surfaces also slope inwards laterally, so as to form a rather deep groove along the suture between each two radial pieces, instead of forming a flat area across between the pseudo-ambulacra, as in *G. Norwoodi*. Again its pseudo-ambulacral areas are proportionally nearly twice as wide as in *G. Norwoodi*, while the portions of the surface exposed are more coarsely granulated than in that species, and the granules differently arranged. As it seems

[July,

to be also less like *G. melo*, or any of the other species known to us from this horizon, we suspect it will be found to belong to an undescribed species, but as we have not seen the summit, nor base, we are left in doubt on this point. Should it prove to be new, however, we would propose for it the name *G. fimbriatus*.

Locality and position.—Upper beds of Burlington group, of Subcarboniferous series, Burlington, Iowa. Mr. Wachsmuth's collection.

ASTEROIDEA.

SCHENASTER WACHSMUTHI, M. & W.

Body flattened, with a regular, distinctly pentagonal outline, the angles being produced into five rather attenuated rays or arms, which are a little convex above, and apparently as much as two-thirds as long as the diameter of the disc, if not more. Disc concave in outline on the outer margin between the rays, and imparting a slightly alate character to the latter, by extending a little along their inner lateral margins; like the dorsal side of the rays, composed above of numerous small, slightly convex plates. Dorsal pores moderately distinct between the plates. Plates of the under side of the disk about as large as the dorsal plates, but flattened, scale-like, crowded, and having the inward imbricating character of the genus very strongly marked. Ambulacra (as seen in a compressed specimen) very narrow, their adambulacral plates moderately large, oval-oblong, comparatively thin, and very strongly imbricating outwards or towards the extremity of the rays. Between these two rows of short, flattened spine-like scales are seen arising from the ambulacral furrow, and all inclining outwards toward the outer extremities of the rays. (Other characters unknown.)

Diameter of disc, 1.22 inch; rays apparently extending as much as 0.90 inch or more beyond the margins of the disc.

This species will be readily distinguished from our *S. fimbriatus*, from the St. Louis limestone, the only other known species of the genus, by its smaller and less convex plates on the dorsal side, as well as by its much thinner, less oblique and more strongly imbricating row of plates along each side of the ambulacra, and particularly by its much narrower ambulacral furrows. We have not seen any traces of the row of short flattened marginal spines seen around the disc of *S. fimbriatus*, nor have the similar little appendages seen arising in a double row from the ambulacra of the species under consideration been seen in *S. fimbriatus*, but it is probable these are generic characters that exist in good specimens of both species. There may have also been similar little flattened spines on other parts of the fossil, as there are some appearances of such little appendages projecting from the transverse sutures between some of the rows of imbricating adambulacral plates.

We take pleasure in naming this interesting species after Mr. Charles Wachsmuth, of Burlington, Iowa, its discoverer, to whom science is indebted for the discovery of many interesting new types of fossils.

Locality and position.—Burlington, Iowa; upper part of Burlington limestone of Subcarboniferous series. Mr. Wachsmuth's collection.

MOLLUSCA.

LAMELLIBRANCHIATA.

PTERIA (PTERINEA ?) MORGANENSIS, M. & W.

Shell (left valve) exclusive of the posterior wing, obliquely subovate, moderately convex, very thin; anterior and basal margins forming an obliquely descending, semi-oval, or semi-circular curve, from the anterior ear to the posterior margin, which is prominently and rather narrowly rounded; hinge line somewhat less than the length of the shell, and ranging at an angle of about 45° above a line drawn from the beak to the most prominent part of the 1866.]

posterior basal margin; beak oblique, rather convex, and placed very near the anterior extremity of the hinge; anterior ear very small, a little convex, but separated from the swell of the umbo by an oblique, shallow, rounded impression,—rounded at the extremity, and defined in outline by a very shallow marginal sinuosity; posterior wing large, flattened, triangular, and defined by a broad, moderately deep rounded sinus,—not equalling in length the most prominent part of the posterior margin below the sinus—in young shells rather acutely angular, but more obtuse in adult specimens. Surface ornamented with numerous linear, radiating costæ, smaller than the flattened spaces between, and crossed by concentric raised lines, so as to form a neat cancellated style of marking, quite as distinct on the ears (particularly the posterior one) as on the body of the valve; radiating costæ increasing by intercalation, the intermediate ones dying out at various distances between the free margin and the beak, all more or less interrupted at various intervals by irregular, shallow, concentric furrows of growth. (Right valve unknown.)

Length of the largest specimen, measuring obliquely from the most prominent part of the posterior basal margin to the extremity of the small anterior ear, 1.55 inch; do. parallel to the hinge line, 1.41 inch; height at right angles to the hinge, 2 inches; length of hinge and anterior ear, 1.17 inch; length of posterior ear, from the beak to its extremity, 0.91 inch.

This rather handsome species has more the aspect of certain Upper Silurian forms, such as *Acicula communis*, Hall, than of any carboniferous species with which we are acquainted, though of course presenting well marked specific differences.

It is a little remarkable, that all of the twenty-five or twenty-six specimens now before us, are left valves, from which fact we may infer that the right valve, being more fragile, was generally broken to pieces by the waves, before being imbedded in the sediment. It is also probable that the right valve was less convex, and more faintly marked than the other, as is usual in shells of this kind. As we know nothing of the hinge and muscular impressions of this shell, we cannot determine whether it is a *Pterinea* or a *Pteria*. If a true *Pteria*, and Kleins old pre-Linnæan names are to be retained, the name of our shell will become *Acicula morganensis*.

Locality and position.—Coal Measures (below the middle), Morgan County, Illinois.

DOLABRA STERLINGENSIS, M. & W.

Shell rhombic-cordate, being cordate in outline, as seen in an anterior and posterior view, and obliquely rhomboidal as seen from either side. Posterior margin obliquely truncated, with a long slope, which is slightly convex above and faintly sinuous near the middle; posterior basal extremity produced obliquely backwards and downwards, with a more narrowly rounded or sub-angular outline; basal margin ascending forward, with a moderately convex curve, and rounding up more or less gradually into the very short or almost obsolete anterior side; hinge line short; cardinal area moderately developed. Beaks prominent, placed nearly over the anterior margin, strongly incurved, and compressed antero-posteriorly; umbonal ridges very prominent, sub-angular, and extending from the beaks obliquely to the posterior basal extremity at an angle of about 68° below the horizon of the hinge, thus dividing each valve into two subequal areas, of which the one behind is flattened or slightly concave between the ridge and the moderately prominent postero-dorsal edge, and that in front and below it convex. Surface marked with concentric striae of growth. (Hinge and interior unknown.)

Greatest length, measuring obliquely from the beaks to the posterior basal extremity, 2.20 inches; diameter at right angles to the same, 1.50 inch; convexity of the two valves when closed, 1.50 inch.

This species is evidently related to *Cyrtodonta Hindi*, of Billings (see Palæozoic Fossils of Canada, vol. 1, p. 151, fig. 131, a, b), from the same

[July,

geological horizon. It differs, however, in several important specific characters, being proportionally much more gibbous, shorter, and, in consequence of its hinge line forming a wider angle with its umbonal axis, distinctly less oblique. It also differs in having its anterior side much less prominent and more broadly rounded below the beaks, which consequently have the appearance of being almost terminal. Its beaks are likewise more compressed antero-posteriorly, and its hinge line shorter. Our specimen does not show the cardinal area very satisfactorily, though it is evidently moderately well developed and shorter than in Mr. Billings' species.

Until the hinge and interior of this shell can be examined, it is scarcely possible to determine very clearly its generic character, but on comparison with *Cucullea angustata*, Sowerby, the type of McCoy's genus *Dolabra*,* and other more obliquely truncated species, such as *C. unilaterialis*, Sowerby, *C. amygdalina*, Phillips, as figured in Phillips' Palæozoic Fossils, we can scarcely doubt the propriety of referring it to the genus *Dolabra*. Some of these species have much the form and general external appearance of the genus *Cucullea*; while Sowerby's figure of an internal cast of the so called *C. angustata* (Geol. Trans. (2), vol. v. pl. 53, fig. 25), seem to indicate a very similar hinge. They appear to want the prominent posterior muscular support and the radiating costæ or striæ of the more modern species of true *Cucullea*, of which, however, they are evidently palæozoic representatives.

Locality and position.—Cincinnati group, of Lower Silurian Series, at Sterling, Illinois.

MACRODON MICRONEMA, M. & W.

Shell rather small, very inequilateral, elongate-oblong, nearly twice and a half as long as high, rather distinctly convex in the anterior and central regions, as well as along the oblique posterior umbonal slopes. Posterior dorsal region compressed above the umbonal ridge. Cardinal margin straight, nearly parallel to the base, and but little shorter than the valves. Ventral margin long and straight, or but slightly sinuous in the middle, and rounding up rather abruptly and nearly equally at the ends. Posterior extremity truncated, with a slight forward inclination, sometimes faintly sinuous in outline. Anterior side very short and rounded. Beaks rather depressed, but rising moderately above the hinge and somewhat flattened on the outer side; incurved, approximate, and placed near the anterior end. Surface ornamented with radiating striæ, which are oblique, coarse, and rather irregular on the compressed posterior region, but become gradually less oblique, finer and more regular anteriorly, so that on the middle and anterior portions of the valves they are exceedingly minute, very regular, and only visible by the aid of a good magnifier in a cross light. A few moderately distinct marks of growth are also seen near the basal and posterior margins. (Hinge, area and interior unknown.)

Length, 0.65 inch; height (at beaks), 0.28 inch; convexity, 0.24 inch.

This little shell has much the form and general appearance of *Macrodon carbonaria*, (= *Arca carbonaria*, Cox, Kentucky Geol. Report, pl. viii. fig. 8), but may be readily distinguished, not only by its smaller size and less nearly terminal beaks, but by the extremely minute size of its radiating striæ on the convex portions of its valves.

Locality and position.—St. Genevieve County, Missouri, in the Chester division of the Subcarboniferous series, also in the same position, Randolph Co., Illinois.

* The genus *Dolabra*, as first proposed by Prof. McCoy, included along with the typical species, such as *Cucullea angustata* and *C. unilaterialis*, Sowerby, *C. amygdalina*, Phillips, &c., other forms belonging to the subsequently established genus *Schizodus*, King. After the separation of the latter group, however, the name *Dolabra* was of course left for the other genus.

GASTEROPODA.

Genus PLATYCERAS, Conrad, 1840.

(Acroculia, Phillips, 1841.)

The genus *Platyceras* was proposed by Mr. Conrad for a group of palæozoic shells, very generally referred by European authors to the Montfort's genus *Capulus*, published in 1810,=(*Pileopsis*, Lamarck, 1812.) Mr. Conrad's description of this genus reads as follows: "I propose to group in this genus the *Pileopsis tubifer*, (Sowerby), *P. vetusa*, (Sowerby), *Nerita haliotis*, (Sowerby), and perhaps *Bellerophon cornuarietes*. These shells are suboval or subglobose, with a small spire, the whorls of which are sometimes free and sometimes contiguous; the mouth is generally campanulate or expanded."* During the following year, Prof. Phillips proposed in his "Palæozoic Fossils," p. 93, the name *Acroculia* for the same fossils.

In this country Mr. Conrad's name has been generally adopted for these shells, which is certainly proper, unless they shall be found to agree with the older genus *Capulus*, since his name has priority over that proposed by Prof. Phillips. Although agreeing with those who regard these fossils as being probably distinct from the existing genus *Capulus*, we believe they are more nearly allied to that group than is generally supposed to be the case by American palæontologists. The only reason assigned by Professor Hall for separating them from the modern genus is, that he had never observed in them any traces of the peculiar horse-shoe shaped muscular scar so conspicuous in the genus *Capulus*.† We have recently, however, found very similar muscular impressions in two distinct species of this genus, one of which seems to be a variety of *P. subrectum*, Hall, from the Keokuk group, while the other is a new species described in this paper from the Waverly Sandstone, of Ohio.‡ In both of these, internal casts show an elongate oval muscular impression on each side, connected by a linear band passing around behind. It is also worthy of note that both of these species belong to the nearly or quite straight section of the genus, for which Prof. Hall at one time proposed the name of *Orthonychia*,§ and hence are less nearly like the modern typical forms of the genus *Capulus* than the great majority of the Palæozoic species.

A careful examination of extensive collections of these shells from our western palæozoic rocks, has also satisfied us that the animal must have been similar in habits to *Capulus* and other types of the family *Capulidae*, to which they evidently belong, in being sedentary shells. This is shown by specimens found attached to crinoids and other objects in such a manner that the sinuosities of the lip exactly correspond to the irregularities of the surface to which they are attached. For instance, we have now before us one of these shells attached to the side of a *Pentremites Godoni*, so as to entirely cover one of the pseudo ambulacral fields and two of the intermediate areas, and yet the sinuosities of its lip conform so exactly to the irregularities of the side of the

* Palæontological Report, New York, 1840, p. 205.

† 12th Ann. Report Regents University New York, p. 16, 1859.

‡ Similar muscular impressions are known to occur in the *Neritidae* and other univalves.

§ Report 4th Dist. N. Y., 1843.

|| In a sheet entitled "Iowa Geological Survey, supplement to vol. 1, part ii, 1859," issued in 1860. Prof. Hall described a patelliform *Platyceras*, from Nauvoo, Illinois, under the name *P. fissurella*, which he says has a perforation just anterior to the apex. Although this is merely mentioned as a specific character, distinguishing it from an otherwise similar species described in the same paper, conchologists will readily understand that such an opening, near the apex of the shell, if natural must have been, judging from all analogy, for an excurrent or anal siphon, as in the *Fissurellidae*, and hence would not only remove the species from the genus *Platyceras*, but from the family *Capulidae*, and place it in the *Fissurellidae*, regarded by the best systematists as belonging to a distinct order from that including the *Capulidae*. A careful examination, however, of the typical specimens of *P. fissurella*, and other examples of the same species from the original locality, now in the possession of one of the writers, leads us to think the perforation alluded to (which only exists in one of the specimens), almost beyond doubt an accidental break in the shell, not a natural perforation.

[July,

Pentremite that the fit looks as if it might have been air tight. The corresponding undulations of the lines of growth likewise show clearly that this nice adaptation of the margins of the lip to the irregularities of the surface of the *Pentremite* could not have resulted from accidental pressure when the edge of the lip was somewhat yielding, since these curves in the marks of growth are seen to extend up the sides of the shell some distance from the margin, where there could have been no flexibility.

This habit of attaching themselves to Crinoids, has led some to think the crinoids were in the act of devouring these mollusks at the moment when they perished, and that these mollusks constituted the chief food of the crinoids. So far as our observations go, however, we do not think the evidence sufficient to establish this fact, since these shells are as often attached to the side of the crinoid below the horizon of the arms as to the summit, and hence out of reach of the mouth, while the conformity of the margins of the shell to the inequalities of the surface to which they are found attached, rather indicates that they grew there. The probability seems to be, that like various other sedentary marine animals, these mollusks, in their very young state, floated freely about until they found a suitable place to attach themselves. We were at one time inclined to think there might also be some reason for believing that the adult shell at least sometimes changed its station, from the fact that in some instances we observe the lines of growth indicating strong sinuosities in the lip during a part of the growth of the shell, which afterwards became suddenly obliterated, to give place to a different set of irregularities, as if the animal had changed its station and adapted the sinuosities of its lip to a new surface. This, however, may have been produced by the lateral expansion of the lip, by which it was brought into contact with different inequalities as the shell increased in size. We have no evidence that they possessed the power of excavating a depression in the surface of attachment, as in *Amalthea*, or of secreting a shelly layer or support under the foot, as in *Hipponyx*.

Prof. Hall has proposed to establish two subordinate groups under this genus, more or less distinct from the typical forms of *Platyceras*. These may be distinguished thus :—

1. *Platyceras*, Conrad. (Typical.) Shell with apex incurved or spiral; surface concentrically striated, sometimes radiately plicate, rarely spiniferous. *Pileopsis tubifer*, Sow.

2. *Orthonychia*, Hall. Shell arched or straight, with concentric striæ. *Platyceras subrectum*, Hall.

3. *Igoceras*, Hall. Differing from the last in having the surface cancellated. Ex. *P. plicatum*, Conr.

It is, however, often very difficult to separate the species into these groups, owing to the numerous gradations by which they blend into each other.

PLATYCERAS LÆVIGATUM, M. & W.

Shell small, dextral, subglobose, composed of two to two and a-half very rapidly expanding contiguous whorls, the first of which is minute; last whorl forming much the larger part of the shell, evenly convex, and although increasing rapidly in size, not properly campanulate; aperture nearly circular, being somewhat straightened on the inner side; lip not sinuous in any of the specimens examined; surface nearly smooth, but showing fine lines of growth under a lense, where not worn.

Length, 0.55 inch; breadth, 0.38 inch.

This little shell is not very nearly related to any of the other carboniferous species of this country with which we are acquainted. It will be readily identified by its small size, rapidly expanding whorls, smooth surface, without folds or plications, and the non-sinuous, regular outline of its lip. From the latter character, it would seem to have attached itself only to even surfaces. In size and the regular smoothness of its surface it is quite similar to 1866.]

P. bivolve, of White & Whitfield, from the Kinderhook group; but it may be readily distinguished by its much more rapidly expanding whorls and consequently larger aperture. It also differs in having the apex of its spire distinctly sunken below the upper side of the body whorl, instead of nearly even with it.

Amongst foreign species, ours is perhaps most nearly allied to *Pileopsis angustata*, of Phillips (Geol. Yorks. 11, pl. xiv, fig. 20), from which it also differs in having its whorls much more rapidly expanding, and its aperture proportionally much larger and more rounded.

Locality and position.—St. Genevieve county, Missouri, and Randolph county, Illinois; from the Chester division of the Subcarboniferous series.

PLATYCERAS HALIOTIDES, M. & W.

Shell rather small, ovate, very oblique and depressed; composed of two very rapidly expanding, nearly or quite contiguous volutions, the last one of which is depressed above, narrowly rounded around the dorsal side, and forms nearly the entire bulk of the shell; apex of spire on a plane with upper side of the body whorl; aperture large, transversely oval, being wider than high; lip sometimes sinuous on the outer or dorsal side; surface with moderately distinct lines of growth. Exfoliated surfaces sometimes showing apparently traces of revolving striæ.

Length, 0.73 inch; breadth, 0.54 inch; height, 0.41 inch.

This species will be recognized by its very oblique depressed form, and the narrowly round character of the outer side of its body whorl, which peculiarities give it much the form of a *Haliotis*. Its first turn, which is quite small, seems to have been sometimes free or slightly detached from the body of the shell, and in other examples in contact with it. The marks of growth generally indicate a rather broad, moderately deep sinuosity of the lip on the dorsal or outer side.

Locality and position.—Waverly sandstone, fifty feet below the Millstone grit, Richfield, Summit county, Ohio.

PLATYCERAS UNCUM, M. & W.

Shell rather under medium size, in adult examples elongate conical and oblique; body portion nearly straight, especially on the posterior side; apex attenuate, pointed, laterally compressed and curved backwards (without any lateral obliquity), so as to form a free hook of about half a turn. Aperture generally a little wider transversely than the antero-posterior diameter, and usually showing a faintly subtrigonal outline, produced by the prominence of the front, and the flattening of the posterior side of the body. Lip irregularly undulated, prominent on each side, broadly sinuous behind and provided with a very deep narrow sinus in front. Surface with the usual undulating concentric striæ crossed on the lower half of the body by small, rather obscure longitudinal plications, and in front by a larger, but narrow prominent ridge, upon which the lines of growth make a strong upward curve, so as to indicate the presence of the anterior sinus during most of the growth of the shell.

Length, 1 inch; breadth (transverse diameter of the aperture), 0.70 inch; antero-posterior diameter of the aperture, 0.55 inch.

This species is intermediate in size and some other respects between *Platyceras acutirostris* (= *Cypulius acutirostris*, Hall), and *Platyceras equilatera*, Hall. In size and general appearance it is most like the former, though it is larger and differs in having its apex merely hooked instead of subspiral, as well as in its prominent anterior ridge and deeper and narrower anterior sinus. From *P. equilatera* it is distinguished by its smaller size, narrower and straighter form (particularly at maturity), less incurved beak, prominent anterior ridge, deep anterior sinus and portionally smaller aperture. It also wants the antero-lateral sinuses of the lip seen in the typical forms of that shell.

[July,

It is quite evident that the nature and position of the sinuities of the lip, as already suggested, in all the species of this genus, were modified to a considerable extent by the nature of the surface to which the animal was attached during life. A careful examination, however, of large collections of most of the known American palæozoic species, shows that there was generally a *tendency* towards a uniformity in the sinus and the corresponding longitudinal ridges, when present, in each species, particularly in those of Carboniferous age.

Locality and position.—Keokuk limestone, of the Subcarboniferous series, at Nauvoo, Ill.

PLATYCERAS (ORTHONYCHIA) CHESTERENSE, M. & W.

Shell small, obliquely conical, more or less arched; apex sometimes rather attenuate, curved or directed backwards so as to stand nearly over the posterior margin; anterior and lateral sides expanding rather rapidly from near the apex; aperture irregularly subcircular; lip margin more or less undulated. Surface marked by fine undulating concentric striæ of growth, and usually with about five rather broad radiating furrows that extend from the lip to the middle or above, so as to leave between them five broad obtuse ridges, which are themselves sometimes faintly divided into smaller irregular costæ near the margin of the lip.

Height, or length, measuring from the anterior basal margin obliquely to the apex, 0.66 inch; transverse breadth of aperture, 0.55 inch; longitudinal do. of same, 0.53 inch.

The most marked feature about this little shell is the rather general presence of about five radiating furrows extending sometimes from near the apex to the margin, so as to divide the surface into about five broad ridges, sometimes themselves faintly subdivided. This character is not in all cases distinctly defined, though the specimens generally show indications of it, while in some instances it is a very conspicuous feature. In this character it is much like the Burlington group species, *P. quincyense*, of McChesney, from which, however, it is distinguished by its much smaller size, more rapid expansion and more arcuate oblique form.

It is a specimen apparently of this species to which we have already alluded as being attached to the side of a *Pentremites Godoni*. The individual so attached is less attenuate, and has the five furrows less defined than the typical specimens of the species, but it nevertheless seems to belong to this species.

Locality and position.—Chester division of the Subcarboniferous series, Chester, Illinois; also in same position Pope county, Ill.

PLATYCERAS (ORTHONYCHIA) SUBPLICATUM, M. & W.

Shell small, depressed conical, somewhat oblique, rapidly expanding from a subcentral apex; anterior slope slightly convex; posterior and lateral slopes straight or a little concave; aperture subcircular; adductor muscular scars finely striated and placed a little above the middle on each side; elongate-subovate or sublunate, being a little arched, with the larger end forward and raised slightly higher than the other, and the posterior ends connected by a linear depression running around behind; surface (of casts) with a few large, irregular radiating folds or plications extending from the margins of the aperture more than half way up towards the apex.

Height, 0.36 inch; antero-posterior diameter, 0.63 inch; transverse, do., 0.56 inch.

We have only seen internal casts of this species, which probably do not give a very correct idea of the nature of the apex, which in the casts is rather obtuse and merely directed somewhat obliquely backwards and upwards. In perfect shells it is doubtless pointed and more or less incurved. The plications of the surface are obtuse and rather obscure in the internal casts. The sur-1866.]

face of the shell is probably also marked with more or less distinct lines of growth. The internal casts show very satisfactorily the muscular scars.

This species has somewhat the general form of *P. fissurella*, of Hall, but is smaller, less oblique, and differs in the possession of large radiating plications.

Locality and position same as last.

PLATYCERAS (ORTHONYCHIA) INFUNDIBULUM, M. & W.

Platyceras subrectum, Hall, 1860. Supplement to Iowa Report, page 1, of additional sheet; (not *P. subrectum*, Hall, 1859. Twelfth Report Regents Univ., N. Y., p. 18.)

Shell straight, more or less elongate-conical, very slightly oblique, attenuate near the straight subcentral apex, thence expanding, at first gradually, then more rapidly to the irregularly subcircular or suboval aperture; lip thin and irregularly undulated, as if to correspond to an uneven surface of attachment. Surface with more or less distinct, undulating, concentric striæ, and near the lip stronger marks or laminae of growth; also generally with a few large, irregular, undefined, radiating plications.

Length, 1.40 inch; breadth about 1.30 inch.

As remarked by Prof. Hall, this species varies considerably in the degree of expansion, some specimens being much more attenuated than others. It is probable that in very young individuals the immediate apex may have been curved or subspiral, but in all those we have seen it is straight, sometimes a little compressed, and only removed from a central position by the slight general obliquity of the whole shell without any curve. In some respects it is similar to *P. quincyense*, of McChesney, from the Burlington division of the Subcarboniferous series. It differs, however, even when, as is sometimes the case, it is nearly as strongly plicated as that shell, in its more irregular, less attenuate form and rougher surface, as well as in not having its folds or plications forming five regular, broad ridges, more or less flattened and concave along their middle.

From *P. fissurella*, Hall, the shell here described differs in being less depressed or more attenuate, particularly near the apex, which is never oblique as in that species.

Prof. Hall had described the species under consideration, in the supplementary sheet quoted above, but as he by an oversight gave it the same specific name (*subrectum*) he had previously applied to another species from the upper Helderberg rocks of New York, it becomes necessary, in order to prevent confusion, that our Illinois species should receive another name, and hence we propose to call it *P. infundibulum*.

From the same locality and position with the above, we have a single specimen differing from the others in being greatly more slender and elongated. It is perfectly straight, somewhat compressed laterally and about twice as long as wide, being very attenuate above the middle and but slightly expanded below. It is an internal cast, showing no surface markings, but preserving the transversely elongate-oval muscular scar on each side, apparently connected by a slender band behind. It is not possible to determine beyond doubt whether this is a distinct species or only a variety of that described above, without having more specimens for comparison. Should it prove distinct, however, we would propose to call it *Platyceras (Orthonychia) extinctor*, in allusion to its resemblance in form to a candle extinguisher.

Locality and position.—Keokuk division of the Subcarboniferous series, Warsaw, Illinois.

Genus METOPTOMA, Phillips, 1836.

From Phillips's figures, and very brief diagnosis of the genus *Metoptoma*,* it

* "Patelliform, face under the apex truncate." Geol. Yorks, 11, p. 223.

is evident he intended it to include only those patelliform palæozoic shells with the posterior side more or less truncated. Mr. Billings, however, and some others extend it so as to include circular or oval species, showing no traces of the posterior truncation, such as were referred by Phillips and others to *Patella*. Although it is probable the typical truncated and the oval or circular species without the posterior truncation represent two distinct genera, it is perhaps impracticable in our present state of knowledge to separate these groups, owing to the fact that there are so many intermediate forms; while it is very rarely indeed that we can know anything in regard to the interior of these fossil shells.

Phillips says nothing respecting the muscular impressions of his typical species, but his figure of *M. oblonga*, which seems to represent an internal cast, shows apparently a horse-shoe shaped scar, like that seen in *Capulus*, *Hipponyx*, and the allied genera. Prof. de Koninck has also shown (Sup. An. Fos., pl. lviii, fig. 1 and 2) this scar very clearly in *M. pileus* of Phillips, and *M. solaris*, (= *Patella solaris*, de Kon.) From these figures it is evident, as observed by Prof. de Koninck, that the open end of the horse-shoe shaped scar is directed away from the truncated side of the shell, showing that the truncated side is the posterior instead of the anterior, as supposed by Phillips.

METOPTOMA (PLATYCERAS?) UMBELLA, M. & W.

Shell much depressed or patelliform, circular in outline; apex central or very nearly so; sides sloping about equally, with generally a slight concavity, in all directions; surface marked by fine lines and obscure wrinkles of growth. Muscular scar on each side, elongate-oval and somewhat arched downwards, with a narrower band connecting them behind.

Length and breadth each about 1.70 inch; height about 0.70 inch.

Although not an uncommon shell, we have never seen a specimen of this species with the apex entire, though in some of the casts it looks as if it may have been suddenly projecting and possibly curved. Hence, we are in doubt whether it may not fall more properly within the genus *Platyceras*, though it is much more depressed and expanded than any species of that genus known to us. As a general thing, the specimens are regularly circular or slightly oval, and without traces of the peculiar truncation of the typical forms of *Metoptoma*, though some of them seem to show obscure indications of it in the slightly less prominent outline of the margin on one side.

On one single partly-worn specimen, apparently agreeing in other respects with the others, there are indications of small, irregular radiating costæ on the lower half of apparently the anterior side. This may possibly be a distinct species, but we cannot be sure of this without more specimens for comparison, since the typical specimens are mostly internal casts.

Prof. Winchell has described, from the Kinderhook beds at Burlington, Iowa (Proceed. Acad. Nat. Sci., Phila., July, 1865), a somewhat similar species, but judging from its measurements, it must be distinctly less depressed than our shell, and differs in being "contracted at the aperture."

Locality and position.—Burlington division of the Subcarboniferous series, Quincy, Illinois; also in same position on Honey Creek, Henderson county, Illinois.

POLYPHEMOPSIS CHRYSALLIS, M. & W.

Shell subfusiform; spire conical, moderately elevated, pointed at the apex; volutions nine, a little convex and increasing gradually in size, last one forming about two-thirds the entire length and moderately produced below; suture distinct; aperture narrow suboval, acutely angular above and narrowly effuse below; inner lip apparently wanting; columella a little arched and twisted; surface showing only very faint traces of lines of growth.

Length, 0.55 inch; breadth, 0.23 inch; apical angle convex on the slopes, divergence about 40°.

1866.]

This species has nearly the form of *Loroxema Newberryi*, of Stevens (an elongated *Macrocheilus*), but is much smaller, and wants the characteristic thickening and fold of the columella seen in that species. In size it agrees more nearly with our *Polyphemopsis inornata*, from a higher position in the coal-measures at Springfield, Illinois. It has its body volution more produced below, and less disposed to become subangular around the middle; while the slopes of its spire are more convex in outline, owing to the proportionally larger size of the middle whorls. This latter character gives it the chrysalis-like form that suggested the specific name.

Locality and position.—Hodge's Creek, Macoupen County, Ill. Lower Coal-Measures.

NATICOPSIS LITTONANA, var. GENEVIEVENSIS.

Natica Littonana, Hall, 1856. Trans. Abany Inst., vol. iv. (p. 30, of extract.)

The shell we here place provisionally as a variety of *Natica Littonana*, Hall (a true *Naticopsis*), agrees almost exactly with authentic examples of that species from the original locality, excepting that it attains some six or eight times the size of the largest of the Indiana specimens, and yet has the same number (four) of whorls. Some of the specimens have the oblique lines rather more distinctly defined around the upper side of the body whorl than we have seen on any of the typical examples of *Naticopsis Littonana*, but this might be expected from their much larger size. These lines, however, are quite distinct on some of the unworn specimens of *N. Littonana*, from Spergen Hill.

Our specimens of the shell under consideration show the inner lip to be little thickened and very smooth, while the columella is moderately flattened. The surface is quite smooth up to the area below the suture, marked by the oblique, very regular striæ, which terminate very regularly and abruptly at their outer extremities. In worn specimens these lines, however, are entirely obsolete. It is not impossible that this may prove to be a distinct species from the *N. Littonana*, though we here place it provisionally as a variety of that species.

Length, 0.73 inch; breadth, 0.67 inch; apical angle about 115°.

Locality and position.—St. Genevieve County, Missouri, and Randolph County, Illinois, Chester division of the Subcarboniferous series.

Genus ANOMPHALUS, M. & W.

Shell depressed, sublenticular, imperforate, smooth and without a spiral band; volutions somewhat embracing above, and each hiding all the preceding ones below; aperture wider than high; peristome not continuous; labium simple and without a notch or sinus, projecting forward above; labium a little sinuous and slightly spreading in the more or less impressed umbilical region.

The type for which this genus is proposed is a little shell having somewhat the aspect of a *Rotella*, but wanting the callus seen filling the umbilical impression in that genus. At a first glance it might be mistaken for a small *Straparollus*, but on examining the under side it is seen to be entirely without an umbilicus, though slightly impressed in the middle; while its lip continues in below nearly to the centre, where it is abruptly deflected upwards, becomes a little thickened, somewhat spreading and more or less sinuous, much as we see on each side of some species of *Bellerophon*.

We have little doubt but this genus belongs to the *Rotellidæ*, which was certainly represented during the deposition of the palæozoic rocks, apparently even by the typical genus *Rotella*,—the well known Devonian *Helicites heliciformis* of Schlotheim being apparently a true *Rotella*.

ANOMPHALUS ROTULUS, M. & W.

Shell small, depressed, sublenticular, narrowly rounded on the periphery;
[July,

spire scarcely visible above the body whorl in a side view; volutions three and a half to four, increasing moderately in breadth, last one sloping with a moderate convexity between the suture and the periphery and slightly excavated in the umbilical region; suture not impressed; aperture transversely suboval, being rounded on the outer side and straightened on the lower half of the inner side, but modified by the return of the body whorl above. Surface showing scarcely any traces of lines of growth, even under a good magnifier. (Type of the genus.)

Breadth of a large specimen 0.19 inch; height 0.07 inch.

Locality and position.—Hodge's creek, Macoupen County, Illinois; Lower Coal Measures.

Genus MICRODOMA, M. & W.

Shell small, rather thick, conical, imperforate, composed of flattened whorls, the last one of which is more or less angular around the middle and little produced below; aperture about as high as wide; outer lip simple, straight, and oblique in outline; columella without folds or plications; inner lip thin and slightly reflexed at the base of the columella. Surface with revolving nodular ridges.

We have for several years past had under consideration a number of good specimens of the little shell, for the reception of which this genus is proposed, but delayed publishing a description of it because we were in doubt respecting its generic relations. At a first glance it presents much the appearance of a *Murchisonia*, or a rather elongated *Pleurotomaria*; but even where the outer lip is broken away, so that the sinus characteristic of these genera could not be seen if it had existed, an examination under a good lense shows that it has no revolving band, and that its lines of growth are without the peculiar curve in passing across the whorls, so invariably accompanying the sinus in the lip of *Murchisonia* and other shells of that type. It also resembles some of the small, short species of *Turritella*, but in addition to its shorter, trochiform outline, its outer lip presents an obliquity and straightness of outline that imparts a peculiar appearance to the aperture, not seen in that genus. From our genus *Orthonema*, with which it is associated in the rocks, it differs, not only in its shorter trochiform outline and nodular revolving ridges, but also in its very oblique lines of growth and the consequent obliquity of its outer lip.

It is not easy to determine the family affinities of this type, but it may possibly belong to the *Littorinidæ*. It is probable that *Pleurotomaria serrilimba* and *P. biseriata*, of Phillips, referred by Prof. de Koninck to the genus *Trochus*, may belong to this genus. We doubt the existence of the genus *Trochus*, as properly restricted to such types as the recent *T. niloticus*, Linnæus, during the Carboniferous epoch.

MICRODOMA CONICA, M. & W.

Shell rather elongate conical or subtrochiform; volutions seven, flattened on a line with the slope of the spire, increasing rather gradually in size—last one not much produced below the mesial angle, where it is only marked by minute striæ of growth; suture rather deep; aperture quadrato-suborbicular. Surface ornamented by three distinct, revolving, nodular ridges, the largest and lowest of which occupies the mesial angle of the body whorl, and passes around immediately above the suture of the whorls of the spire, while the upper one occupies the upper margin of all the whorls just below the suture, and the third one passes around midway between the others. Lines of growth small and crossing the flattened sloping sides of each whorl obliquely, so as to indicate a distinct forward extension of the outer lip at its connection with the body whorl above. Nodes of the revolving angles small, closely and regularly arranged on the different ridges, so as to form oblique rows parallel to the lines of growth.

Length, 0.21 inch; breadth, 0.12 inch; apical angle, 36°.

1866.]

This species seems to be much like *Pleuratomaria serrilimba*, of Phillips, judging from his figure, (Geol. Yorks. 11, pl. xv. fig. 30); but it is utterly impossible to make satisfactory comparisons with species so briefly described and poorly figured, without having access to authentic specimens.

Locality and position.—Macoupen County, Ill. Lower Coal Measures.

ORTHONEMA CONICA, M. & W.

Shell elongate conical, thin. Volutions (in adult shells) about nine, flattened nearly on a line with the slope of the spire, or but slightly convex; lower ones sometimes a little projecting at their lower margins immediately above the suture; last one distinctly angular around the middle, and but moderately produced below the angle, where it is a little convex. Umbilical region not indented. Suture generally well defined between the lower whorls, and merely linear above. Aperture rhombic subquadrate. Surface showing, under a magnifier, small, very slightly oblique lines of growth, which are sometimes crossed on the middle of the flattened outer slope of the body whorl, by very faint traces of two revolving ridges, and below the angle, on the under side, by traces of another revolving ridge.

Length, 0.70 inch; breadth, 0.30 inch; apical angle a little convex on its slopes, divergence about 30°.

This species will be readily distinguished from our *O. Salteri*, from the same locality and position, by its larger size, smaller number of whorls, greater apical angle, and particularly by never having the two linear revolving ridges just below the suture, so characteristic of that species. As mentioned in the description, it sometimes, though rarely, shows traces of two very obscure revolving ridges on the flattened part of the body whorl, but these are midway between its principal angle and the suture, while those on *O. Salteri* are always very distinct, and placed just below the suture. The principal angle on the body whorl of *O. Salteri* is also much more distinct, being a true carina.

From the several species of *Polyphemopsis* of our coal-measures, such as our *P. inornata*, *P. peracuta*, &c., which it somewhat resembles, this species will be distinguished by its angular body whorl; and particularly by not having this whorl produced below, and its columella curved outwards and truncated, so as to produce the peculiar effuse character of the base of the aperture seen in that genus.

Locality and position.—Hodge's Creek, Macoupen County, Ill. Lower Coal Measures.

TROCHITA? CARBONARIA, M. & W.

Shell small, depressed trochiform, or broadly conical, about twice as wide as high, circular in outline as seen from above; periphery alate and very sharp, not serrate or crenate; apex central, mammillated; volutions about five, flattened or a little concave in the middle; suture merely represented by a nearly obsolete line scarcely visible without the aid of a magnifier; aperture unknown; umbilicus small, infundibuliform. Surface smooth on the upper whorls, but showing moderately distinct, extremely oblique lines of growth on the last turn.

Breadth, 0.35 inch; height, 0.17 inch; apical angle about 105°.

This little shell resembles quite nearly *Trochella prisca*, of McCoy, from the Carboniferous limestone of Ireland; from which it differs in its much smaller size, and moderately distinct lines of growth. So far as we know, it is the first shell of this type ever found in our American Palæozoic rocks. Its alate margin seems to project as a sharp rim around the periphery, and the general aspect of the shell is very like that of the genus *Phorus*, though we have been unable to see any indications of foreign bodies being attached to the margin. We are not sure, however, but we would be nearer right in calling it *Phorus carbonarius*, or *Onustus carbonarius*.

[July,

Locality and position.—St. Genevieve Co., Missouri; Chester division of the Subcarboniferous series.

PLATYSCHISMA HELICOIDES, Sowerby? (sp.)

The specimens before us agree so exactly with the figures and descriptions of Sowerby's *Ampullaria* (*Globulus*) *helicoides*, from the English Mountain limestone, that we are completely at a loss to find any characters by which it can be distinguished. The largest of them are somewhat smaller than the average size of English specimens, and none of them are so depressed as the form for which Phillips proposed the name *Natica elongata*; their outline being more nearly like Sowerby's fig. 2, pl. 522, Min. Con. On comparison with specimens of the Belgian form from Tournay (usually referred to Sowerby's species), which they never equal in size, and which seem to us probably distinct from the English species, they are found to differ in having the whorls less rounded above, and the revolving striae within the small umbilicus coarser. The surface is quite smooth, the apex rather obtuse, and some of the specimens show indications of the faint sinus in the outer lip, which has caused the European specimens to be sometimes referred to the genus *Pleurotomaria*. There are no traces of a spiral band, however, and some individuals seem to have had no notch or sinus in the lip.

Locality and position.—Chester limestone, of the Subcarboniferous series, St. Genevieve Co., Missouri; where it is quite abundant, and occurs with a *Nautilus* (*Trematodiscus*) we cannot distinguish from *N. sulcatus*, Sowerby.

PLEUROTOMARIA CONOIDES, M. & W.

Shell small, regularly conoid-trochiform, longer than wide, the breadth being to the length about as five to six. Volutions five or six, increasing regularly and rather gradually in size,—all obliquely flattened nearly parallel to the slope of the spire, though the lower margin of each projects at the suture slightly beyond the upper edge of the succeeding one below; last one angular around the periphery at the base, and flattened on the under side at less than a right angle to the oblique slope above, but rounding abruptly into the minute umbilical perforation within. Aperture rhombic quadrangular, with nearly equal length and breadth; inner lip straight and parallel to the axis of the shell below, but curving out abruptly at its base. Surface ornamented with small, regular, oblique, arching striae on the upper sloping sides of the whorls, and minute sigmoid lines, crossed near the periphery by faint traces of a few revolving striae, on the under side of the body whorl. Spiral band narrow, located at, or slightly above the periphery of the body volution, and passing around its own breadth above the suture on the whorls of the spire; margined above and below by a raised line.

Length, 0.27 inch; breadth, 0.23 inch; apical angle regular, divergence about 50°.

This species belongs to the trochiform section of the genus, including *Pleurotomaria obtusispira*, and *P. Riddellii*, Shumard; *P. turbiniformis*, M. & W., and *P. Missouriensis*, Swallow, (sp.) It differs from all these shells, however, in being much smaller, although composed of about the same number of whorls; while it also differs from them all excepting the *P. obtusispira* in having no revolving striae on the upper side of its whorls, and from that species in having a more elevated spire, and rather coarse, instead of "extremely fine, striae of growth" on the upper slope of its whorls. In form and general appearance it resembles quite nearly *Trochus coniformis*, de Koninck (An. Foss. pl. xxxvii. fig. 4, a, b,)* but differs in wanting the spiral striae, and of course in the possession of a distinct, but narrow spiral band.

*This shell resembles so closely in form, surface markings and general outline, several of our American Carboniferous species of *Pleurotomaria*, that in case it had been described by a less experienced palaeontologist than Prof. de Koninck, we should have suspected it to belong to that genus instead of being a true *Trochus*. In our *Pleurotomaria turbiniformis*, for instance, and the beautiful species described by Prof. Swallow under the name *Trochus Missouriensis*, the spiral band is so very narrow and inconspicuous as to be easily overlooked, when the margin of the lip is broken away.

Locality and position.—Hodge's Creek, Macoupen County, Ill. Lower Coal Measures.

PLEUROTOMARIA COXANA, M. & W.

Shell attaining a large size, obliquely conoid-subtrochiform, longer than wide; spire turreted, forming rather more than half the entire length. Volutions six to seven, convex, very prominent or obtusely subangular below the middle, at which point those of the spire project out over the suture; all flattened or slightly concave above, with an outward slope of about 35° to the axis, from the suture to the most prominent part, where the spiral band is placed; below this the underside is rounded convex to the small umbilical perforation. Suture strongly defined by the convexity of the whorl just above it. Aperture subquadrate, approaching subcircular in adult shells. Surface ornamented by exceedingly fine, regular lines of growth, that run very obliquely backwards, with a slight forward curve in passing down the sloping upper side from the suture to the spiral band at the most prominent part of the whorls; between this and the umbilical perforation below they make a backward curve. Casts also show some traces of much stronger revolving lines in the umbilical region.

As is not uncommon in species of this type, the divergence of the apical angle varies considerably with age, being greater in young than adult shells. In internal casts there is a moderately distinct umbilical perforation, which seems to be very small, or nearly closed in specimens retaining the shell. The lines of growth are exceedingly fine and regular, without any traces of revolving striae, excepting near the umbilicus, and we are not sure they really exist there, as only traces of apparently such lines have been seen.

This shell will be readily distinguished from all of those known to us, approaching it in size, such as *P. tabulata*, Conrad, and *P. subscalaris*, M. & W., by its more oblique form, more sloping and less angular whorls, as well as by the absence of any traces of revolving striae on the upper slope of its whorls.

The specific name is given in honor of Prof. E. T. Cox, of New Harmony, Indiana, to whom we are indebted for the use of the best specimen of the species we have seen.

Locality and position.—Iron ore beds of Lower Coal Measures, at Nolan's Furnace, Edmondson Co., Kentucky.

PLEUROTOMARIA SPIRONEMA, M. & W.

Shell rather under medium size, subglobose, its length and breadth being nearly equal. Volutions five to six, increasing rather rapidly in size; those of the spire convex; the last one forming more than four-fifths of the entire length, and as much as nine-tenths the entire bulk of the shell,—rounded regularly from the suture above to the umbilical region below, excepting near the aperture, where it is a little more prominent below than above the middle. Suture well defined. Aperture subcircular in general outline, but rather strongly modified above the middle on the inner side, by the return of the body whorl. Inner lip slightly thickened and deeply arcuate below, but wanting or exceedingly thin above the middle of the aperture; columella tortuous, with a slightly impressed furrow at the outer margin of the inner lip, but without an umbilical perforation. Surface ornamented with regular, distinct revolving striae, crossed just below the suture by short little regular node-like folds, confined to the narrow space between the suture and the spiral band; similar, but smaller, more crowded and longer curved wrinkles also radiate from the umbilical region, on the under side of the body whorl. Lines of growth obscure on all the specimens examined. Spiral band flattened so as to be even with the general surface, nearly smooth, and placed half-way between the middle of the body whorl and the suture above, or about once and a half its own breadth below the suture.

[July,

Length and breadth of a medium sized specimen, each 0.45 inch; length of aperture, 0.25 inch; breadth of do., 0.23 inch; apical angle convex, divergence, 90°; breadth of spiral band at the aperture 0.07 inch.

This species is nearly related to *P. Beckwithana* of McChesney (New Palæozoic fossils, p. 61), with which we supposed it to be identical from Prof. McChesney's description, until we had an opportunity to compare it with good examples of the *P. Beckwithana* from the original locality. On comparison with these, we find our shell to be readily distinguished by having its spiral band located midway between the middle and upper margin of the body whorl, instead of passing around the middle of the outer side. It likewise differs in showing no traces of revolving striæ on the spiral band, and in having small wrinkles crossing the revolving striæ on the under side of the body whorl, while the little wrinkles around the upper edge of the whorls are stronger and shorter than in *P. Beckwithana*. Again there is a difference in the revolving striæ, those of our shell never having an intermediate smaller one between two larger ones, as is generally the case with those of McChesney's species.

The close similarity between these two species, both in form and ornamentation, shows the necessity for great care and precision in drawing up descriptions of species, even where they may be widely different from all *known* forms; since we often find, in such cases, that other species are afterwards discovered that cannot be distinguished by the original description from the forms first described. Every word in Prof. McChesney's description, excepting what is said in regard to the starting point of the spiral band, would apply equally well to our species. It is true, he gives the number of whorls as four or five, while in our shell they may be described as numbering five or six, but of course little reliance can be placed upon a difference of only one whorl, where they are all counted to the extreme apex.

Locality and position.—Lower Coal Measures, on Hodge's Creek, Macoupen County, Illinois.

PLEUROTOMARIA VALVATIFORMIS, M. & W.

Shell minute, depressed, or about twice as wide as high; volutions three and a half to four, regularly rounded, and increasing rather gradually in size; suture well defined in consequence of the convexity of the whorls; umbilicus proportionally small or closed; aperture suborbicular, being a little straighter on the inner side. Spiral band nearly or quite even with the surface of the whorls, and placed on the middle of their outer side. Surface smooth, as seen without a magnifier, but presenting traces of microscopic revolving striæ, in a good light under a strong lens.

Height, 0.04 inch; breadth, 0.08 inch.

This is by far the smallest species of the genus we have ever seen, and if it were not for the fact that we find so many specimens of it not exceeding the dimensions given above, we would think might be a young shell. This, however, taken in connection with the absence, so far as yet known, of any species in our carboniferous rocks agreeing near enough for this to be its young, are sufficient reasons for believing it to be an adult shell. It is more nearly like our *P. micronema* of this paper than any of its associates with which we are acquainted, but in addition to its vastly smaller size (although having nearly the same number of whorls), it differs in being much more depressed, and in having proportionally much more slender whorls; while its spiral band passes around the middle of the body whorl, instead of between the middle and the upper margin. In the position of its band it is nearer like *P. Beckwithana* of McChesney, but differs so widely in size, and other characters, as to render a close comparison unnecessary.

Locality and position.—Hodge's Creek, Macoupen County, Ill. Lower Coal Measures.

1866.]

MURCHISONIA INORNATA, M. & W.

Shell very small, conic subovate; axis imperforate; spire short (for a *Murchisonia*). Volutions six, convex, increasing rather gradually in size, last one forming more than half the entire shell, most prominent around the middle, but not even obtusely angular, a little produced below; suture impressed. Aperture slightly oblique, subovate in outline, being angular above, and rounded and apparently faintly effuse below. Spiral band not distinguishable from the general surface of the whorls, excepting from the curve of the minute lines of growth, as seen by the aid of a magnifier; apparently of moderate breadth, and placed about half-way between the middle and upper side of the body whorl, passing around near the middle of those of the spire. Surface appearing nearly smooth to the eye, but when examined with a magnifier, seen to be ornamented with small obscure revolving striæ, most distinct below the middle of the body whorl; crossing these, traces of very minute lines of growth may be seen, by the aid of a good lens in a favorable light, curving strongly backwards as they approach an undefined spiral band.

Length, 0.22 inch; breadth, 0.13 inch; apical angle about 38°.

This is one of those intermediate forms, that might, so far as can be determined from the shell, be referred with almost equal propriety to either *Murchisonia* or *Pleurotomaria*. Although we have placed it in the former genus, we are not sure but we should call it *Pleurotomaria inornata*. It will be readily distinguished from all the little species of either of these genera known to us, that have neither costate nor carinated whorls, by its nearly smooth surface and obsolete spiral band. Excepting in its much smaller size, and less produced body whorl, it has somewhat the look of *Murchisonia melanoides*, de Koninck, (An. Foss. pl. iii. sup. fig. 14, a, b,) but the more produced lower part of the body whorl of that shell gives its aperture a different form, while it has a well defined spiral band occupying a lower position on the whorls, and no traces of revolving lines.

Locality and position.—Hodge's Creek, Macoupen County, Illinois. Lower Coal Measures.

CEPHALOPODA.

NAUTILUS [TREMATODISCUS] SULCATUS, Sowerby?

Amongst other specimens from the Chester group of St. Genevieve County, Missouri, we have several examples of a small *Nautilus*, agreeing so nearly with Sowerby's *N. sulcatus* that we are strongly inclined to believe it identical with that species. It attains about the same size, has a similar umbilicus, the same number of whorls, with the same number of furrows and intermediate ridges on each side, and like that species has a small, nearly central siphon; while it also agrees in the size and flexures of its lines of growth, as well as in the variations it presents. The only differences we can see are that our shell seems to have the whorls generally more compressed, and its furrows and ridges sometimes more obsolescent on the outer volution of the larger specimens. Still it generally agrees quite as nearly with the typical forms of that species, as those usually referred to it by the most reliable European authorities, and even more nearly than many of these do with each other. (Prof. de Koninck's description of *N. sulcatus* agrees exactly with our shell.) Its lines of growth make so strong a backward curve in crossing the slightly concave, rather narrow periphery, that we were at first inclined to think it a large *Porcellia*, but a closer examination soon satisfied us that it is septate, and provided with a small, nearly central siphon. In short, it is a typical example of the group for which we proposed the subgeneric name *Trematodiscus*.

We are not aware of this species having been previously identified in America.

[July,

NAUTILUS (CRYPTOCERAS) ROCKFORDENSIS, M. & W.

As the only specimen of this shell we have seen consists of not more than half of a volution, we are left in some doubt whether it is a *Cryptoceras* or a *Gyroceras*. Its volutions were evidently not embracing, as they are not at all concave on the inner side, but rounded all around, so as to present a slightly oval, or subelliptic section, the transverse diameter of which is to the dorso-ventral, as 132 to 110. The half volution curves around an umbilical cavity apparently rather more than half as wide as the greatest dorso-ventral diameter of the volution at the same point. The siphon, although not quite in contact with the dorsal side, is so near it as to give the internal cast the appearance of having a small deep dorsal lobe. The septa are distant, measuring, on the dorsal side, about two-fifths the dorso-ventral diameter of the whorl at the point of measurement, and their edges pass almost directly around the whorls. (Surface, number of whorls and aperture unknown.)

Length of a half turn, including a small portion of the last chamber, measuring around the dorsum, 3.78 inches; greatest transverse diameter at the larger end, 1.80 inch; dorso-ventral do., 1.60 inch.

It is probable, judging from analogy, that the lip of this species, in entire specimens, will be found to be pinched out or projecting laterally on each ventro-lateral margin of the aperture, as in some other species of this type. We know of no other species with which it is liable to be confounded.

Locality and position.—Goniatite limestone, of the Kinderhook division of the Subcarboniferous series, at Rockford, Indiana.

NOTE.—In the August number of the Proceedings of the Academy for 1865, p. 165, we proposed the name *Evactinopora*, for a curious radiated body, evidently belonging to the *Polyzoa*, from the carboniferous rocks of Missouri. Since that time, farther comparisons lead us to think this fossil possibly not generically distinct from *Conodictyum* of Münster. If so, the name of our species will of course become *Conodictyum radiatum*. It is a little remarkable, however, that the known species of *Conodictyum* are from Jurassic rocks.

August 7th.

The President, DR. HAYS, in the Chair.

Fifteen members present.

August 14th.

The President, DR. HAYS, in the Chair.

Fifteen members present.

August 21st.

The President, DR. HAYS, in the Chair.

Twenty-two members present.

Prof. Cope exhibited the remains of a gigantic extinct Dinosaur, from the Cretaceous Green Sand of New Jersey. The bones were portions of the under jaw with teeth, portions of the scapular arch, including supposed clavicles; two humeri, left femur, and right tibia and fibula, with numerous
1866.]